Extended Euclidean Algorithm (pseudocode version)

The following algorithm will compute the GCD of two polynomials $f, g$ as well as linear combination $sf + tg = GCD(f, g)$ (and more information). Important convention: $LC(f) :=$ to the leading coefficient of $f$, and we define $LC(0) = 1$.

**Input:** $f, g$ polynomials.

**Output:** Integer $l$, polynomials $p_i, r_i, s_i, t_i$ for $0 \leq i \leq l + 1$, and polynomial $q_i$ for $1 \leq i \leq l$, such that $s_i f + t_i g = r_i$, and in particular, $s_l f + t_l g = r_l = GCD(f, g)$.

- Set $p_0 := LC(f); p_1 := LC(g); r_0 := f/p_0; r_1 := g/p_1$.
- Set $s_0 := 1/p_0; t_0 := 0; s_1 := 0; t_1 := 1/p_1$.
- $i := 1$ (counter).
- While $r_i \neq 0$ do
  - $q_i := r_{i-1}$ quotient $r_i$;
  - $p_{i+1} := LC(r_{i-1} - q_i r_i)$;
  - $r_{i+1} := (r_{i-1} - q_i r_i)/p_{i+1}$;
  - $s_{i+1} := (s_{i-1} - q_i s_i)/p_{i+1}$;
  - $t_{i+1} := (t_{i-1} - q_i t_i)/p_{i+1}$;
  - $i := i + 1$;
- od;
- $l := i - 1$;
- RETURN($l, p_i, r_i, s_i, t_i, q_i$);